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IS 9557 (1980): Wick Lamps, Non-pressure Type [MED 26: Oil Burning Appliances]

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Indian Standard

SPECIFICATION FOR WICK LAMPS, NON-PRESSURE TYPE

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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December 1980

Indian Standard

SPECIFICATION FOR WICK LAMPS, NON-PRESSURE TYPE

Oil Burning Appliances (Non-Pressure Type) Sectional Committee, CPDC 2

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Indian Standard

SPECIFICATION FOR WICK LAMPS, NON-PRESSURE TYPE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 12 July 1980, after the draft finalized by Oil Burning Appliances (Non-Pressure Type) Sectional Committee had been approved by the Consumer Products and Medical Instruments Division Council.

0.2 The wick lamp was considered to be an important consumer item, being mostly used in countryside and field areas. The committee responsible for formulating national standards on oil burning appliances (non-pressure type) therefore felt the need to establish a standard on this item.

0.3 Assistance has been derived from BS 2049 : 1976 Specification for kerosine (paraffin) lighting appliances for domestic use, issued by the British Standards Institution.

0.4 The requirements in regard to materials have been of acceptable grades, but the use of other materials having characteristics equivalent or better is not precluded, subject to an agreement between the purchaser and the supplier.

0.5 Wick lamps conforming to this standard shall be supplied complete with glass globes and wicks.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements for wick lamps, complete with globe and wick, burning kerosine from the wick at atmospheric pressure.

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*Rules for rounding off numerical values (*revised*).

2. TYPES

2.1 The wick lamps shall be of the following types:

Type 1 — Solid round wick-lamp

Type 2 — Single flat wick-lamp

3. NOMENCLATURE

3.1 For the purpose of this standard the nomenclature as indicated in Fig. 1 and 2 shall apply.

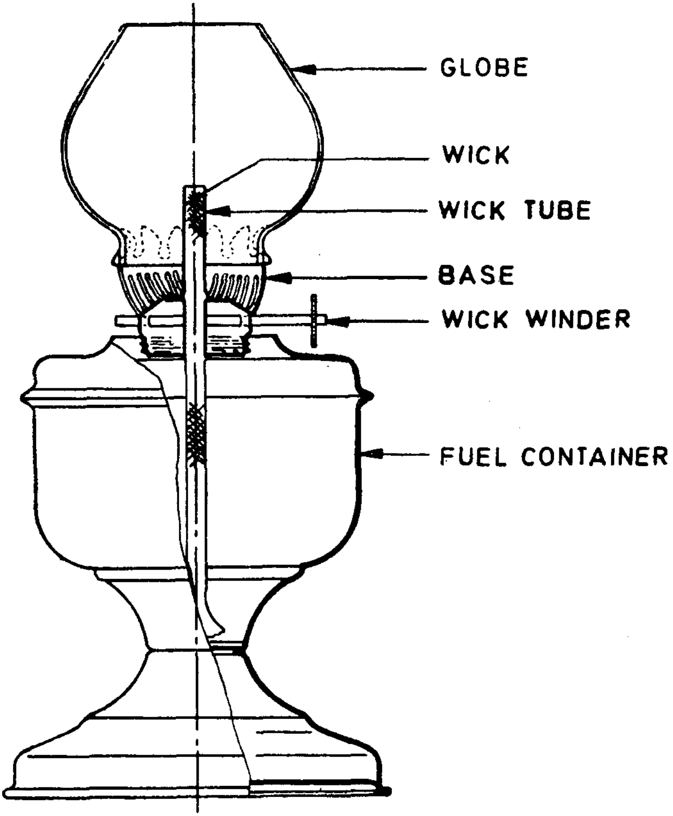

Fig. 1 Wick Lamp Type I

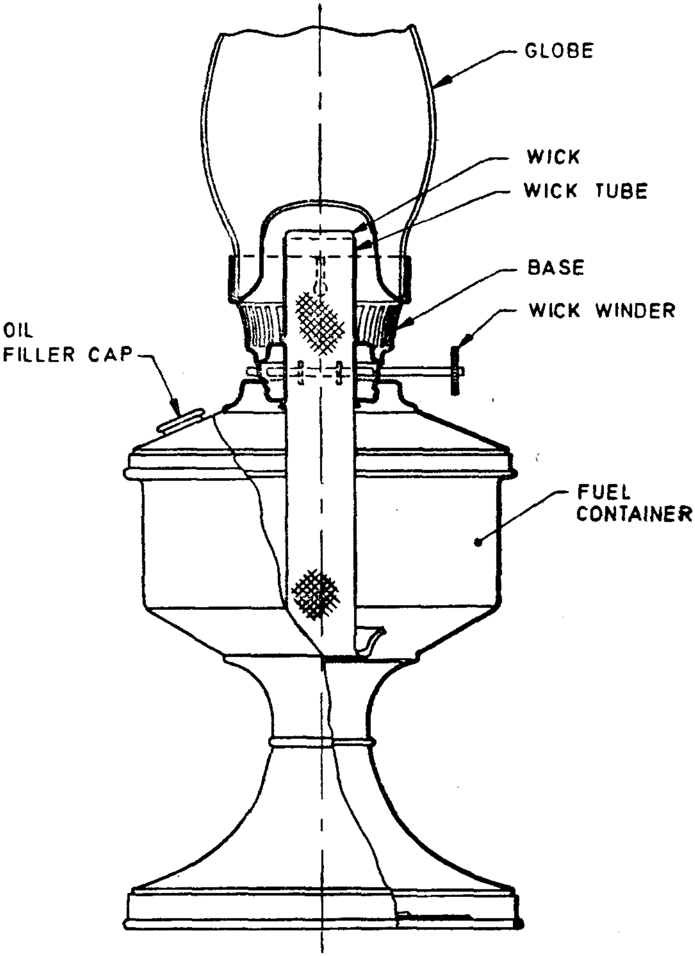

FIG. 2 WICK LAMP TYPE II

4. MATERIALS

4.1 The various components of wick lamps shall be made from the materials as shown against each:

Component	*Material*	*Conforming to*
Fuel container, base, wick tube, filler cap	Mild steel sheet 0·315 mm thickness	Grade DD-1079 of IS : 1079-1973*
	or	
	Brass sheet 0·56 mm thickness	Grade CuZn40 (A) of IS : 422-1967†
Wick winder gear	Brass sheet or strip	—
Wick winder	Hard drawn M. S. wire having tensile strength 700 to 950 MN/m^2 (70 to 95 kgf/mm^2 approx), 3·15 mm thickness	IS : 280-1978‡
	or	
	Hard drawn brass wire 3·15 mm thickness	IS : 4413-1967§
Chimney or globe	Heat-resisting glass	—

4.2 The flat cotton wick shall satisfy the requirements covered under **3** of IS : 1740-1977||.

5. WORKMANSHIP AND FINISH

5.1 General — The design and construction of the lamp shall be such that harmful distortion does not occur under normal conditions. The lamp shall be safe and reasonably durable. Deep drawn brass parts shall be heat-treated to prevent season cracking. This shall be tested by the mercurous nitrate test given in IS : 2305-1962¶.

5.2 Fuel Container — All joints below the full fuel level shall be thoroughly sweated with solder or otherwise firmly joined to give a fuel-tight joint.

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*Specification for hot rolled carbon steel sheet and strip (*third revision*).

†Specification for brass sheet and strip for the manufacture of utensils (*first revision*).

‡Specification for mild steel wire for general engineering purposes (*third revision*).

§Specification for brass wires for general engineering purposes.

||Specification for flat cotton wicks for hurricane lanterns and lamps (*first revision*).

¶Method for mercurous nitrate test for copper and copper alloys.

5.3 Wick Tube — The wick tube shall be sufficiently strong to avoid harmful distortion in normal use and shall be mounted so that fuel leakage in service is prevented.

5.4 Wick Winder

5.4.1 In the wick winding mechanism, the wick gears shall be symmetrical and shall be tightly fitted to the winder to avoid play between the winder and the gears. The teeth of the gears shall not be so sharp as to damage the wick. The winder and the gaps shall be coaxial. The winder shall be so fitted that the gaps between the sides of the sleeve and the gears shall be equal, thus ensuring proper movement of the wick.

5.4.2 The mechanism shall give an even adjustment of the wick and shall be so mounted that fuel leakage in service is prevented. It shall be so positioned and constructed as to be readily accessible when the lamp is in operation and its surface temperature shall not exceed 60°C.

5.5 Globe

5.5.1 It shall be of a uniform thickness of glass throughout. It shall be free from cracks and shall be substantially free from stones, blisters, air bubbles, cords and other visual defects.

5.5.2 The globe shall be transparent and when determined by the method described as in Appendix A, the absorption of light by the globe shall not exceed 5 percent. The globe shall withstand the thermal shock test when tested in accordance with IS : 6506-1972*.

5.6 Assembly of Removable Components — Removable components shall preferably be so constructed that the possibility of incorrect assembly is precluded. Where this is not possible, they shall be marked clearly to show their correct relative position. Where it is necessary to remove a component to light the lamp, the construction shall ensure that this component can be assembled only in its correct position.

6. FINISH

6.1 All the brass components shall be plated chromium over nickel with copper base in accordance with Service Grade No. 3 of IS : 4827-1968†.

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*Methods for thermal shock test on glassware.

†Specification for electroplated coatings of nickel and chromium on copper and copper alloys.

In case the components are from mild steel, they shall be plated with chromium over nickel with copper base in accordance with Service Grade No. 3 IS : 1068-1968*.

7. MARKING

7.1 Each wick lamp shall be legibly and indelibly marked on its fuel container with the following:

i) Name, initials or recognized trade-mark;
ii) Type; and
iii) Country of origin.

7.1.1 The wick lamps may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

8. PACKING

8.1 Each lamp shall be put in a craft paper bag. The lamps shall then be packed in wooden boxes lined inside with tar paper and with wood shavings or paper cuttings. Each box shall contain two dozen lamps of Type 1 or Type 2.

9. SAMPLING

9.1 Sampling and acceptance criteria for wick lamps shall be as agreed to between the purchaser and the supplier. A recommended scheme for the same is given under **9.1.1** to **9.1.3**.

9.1.1 For the purpose of sampling, the consignment shall be subdivided into lots of 300 lamps or part thereof. The lamps constituting any one lot shall be of one type and size and belong to one batch of manufacture.

9.1.2 Five boxes shall be selected at random from each lot for drawing lamps for testing. From each box so selected, one lamp shall be chosen to form the test sample.

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*Specification for electroplated coatings of nickel and chromium on iron and steel (*first revision*).

9.1.3 All the samples shall be tested for the requirements of design, construction and dimensions given in **4** and **5** and of finish given in **6.** If the test samples satisfy the requirements given in **10.1**, then three samples shall be selected from them for test on performance and safety requirements given in **11**.

10. CRITERIA FOR ACCEPTANCE

10.1 A lot shall be considered as conforming to the requirements of design, construction, dimensions and finish, if a total number of defects observed in the samples are not more than 5, subject to the defects of any one particular type not occurring more than twice.

10.2 A lot shall be considered to have satisfied the performance and safety requirements given in **11**, if not more than one defect of any one type is observed in the three samples so tested.

11. PERFORMANCE AND SAFETY

11.1 Fuel for Performance Test — The kerosine to be used in conducting the performance test mentioned below shall conform to IS : 1459-1974*.

11.2 Lighting Efficiency — When measured by the method specified in Appendix B the average efficiency of three lamps shall be not less than 0·15 for Type 1 lamps and 0·25 for Type 2 lamps.

11.3 Surface Temperature — The surface temperature of any part that may be necessary, to touch during the operation of the lamp shall not exceed 60°C.

11.4 Stability Test — The lamp, both when full and when empty, shall be capable of being dipped to an angle of 20° from the vertical in any direction and shall not overturn when released.

11.5 Safety — The lamp shall not catch fire when it is burned continuously for a period of 12 hours (or until the fuel is consumed, whichever is the shorter period) at any height below its normal full flame height.

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*Specification for kerosines (*second revision*).

APPENDIX A

(*Clause* 5.5.2)

TEST FOR ABSORPTION OF LIGHT

A-1. PROCEDURE

A-1.1 Two sub-standard lamps of approximately the same luminous intensity shall be mounted on the standard photometer bench which is used for determining the horizontal luminous intensity of lamps. One of the two sub-standard lamps shall be covered completely with the glass globe under test and its luminous intensity measured against the other sub-standard lamp. The difference, when expressed as percentage of the original luminous intensity, shall be taken as the absorption of light by the globe.

A-1.2 This test shall be carried out before and after the thermal shock test (*see* **5.5.2**). There shall not be any variation in the two readings for absorption of light.

APPENDIX B

(*Clause* 11.2)

METHOD FOR MEASUREMENT OF LIGHTING EFFICIENCY

B-1. PREPARATION OF THE LAMP AND THE WICK

B-1.1 The fuel container of the lamp shall be filled with the filtered kerosine up to three-fourth of its full capacity.

B-1.2 The globe of the lamp shall be thoroughly cleaned with soap and water, rinsed with distilled water and dried.

B-1.3 New wick shall be used for each test, which shall be of three hours duration. The wick shall be trimmed in such a manner that a regular semi-circular frame is obtained. In case of flat wick, the trimming shall be done as follows:

a) Cut the wick level with the wick-guide (or wick tube);

b) Raise the wick and cut off a triangular portion from each corner and round off *the sharp corners slightly as shown in the side-*view in Fig. 3; and

c) Remove any ragged projections from the top edges of the wick by bevelling them slightly as shown in the front view in Fig. 3.

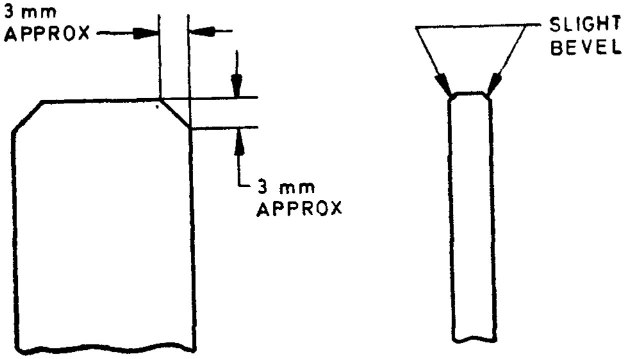


FIG. 3 WICK

B-2. PHOTOMETRIC EQUIPMENT

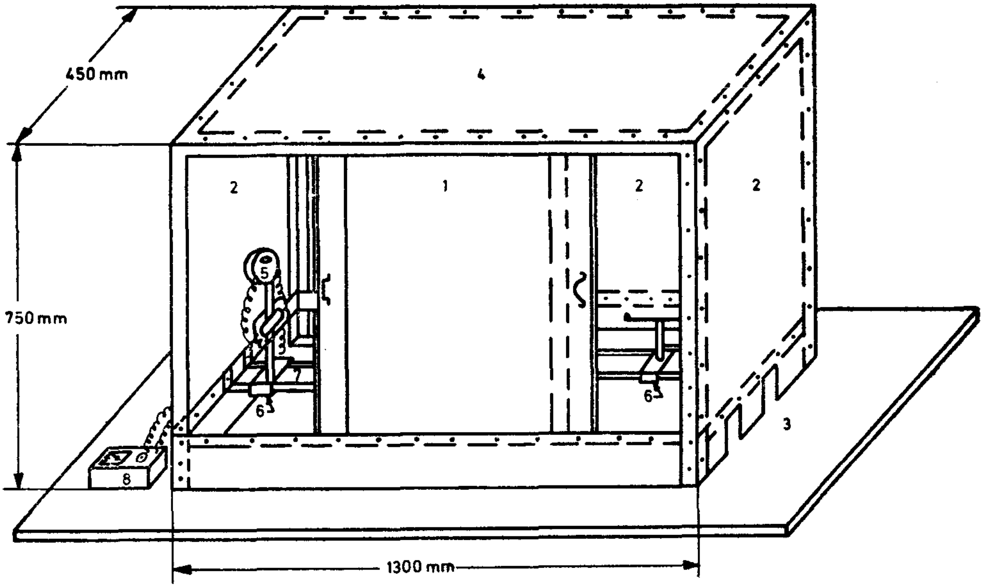
B-2.1 The measurement of mean horizontal luminous intensity and fuel consumption rate shall be done in a wooden enclosure having dimensions 1 300 × 450 × 750 mm, painted black from inside with full black paint (*see* Fig. 4) and incorporated with the following:

a) Optical bench,
b) Two uprights, which can be slided over the bench,
c) A rotable metallic disc mounted on the upright for placing the lantern,
d) Lux meter with photo electric selenium cell (or lux meter cell).

The enclosure may have sliding door in the front. The top may be made into two halves, fixed with hinges so that one half may be lifted off when measurements are not being taken, while the lamp is burning inside the enclosure. Suitable openings may be provided at the bottom of the enclosure for entry of fresh air.

B-3. PROCEDURE

B-3.1 The lamp, before the test, shall be kept burning for at least 30 minutes to attain a steady condition at its maximum non-smoking flame height. Then the initial mass of the lamp shall be taken while it is alight.



1 — SLIDING SHUTTER
2 — SIDES
3 — BOTTOM PLANK
4 — ROOF
5 — LUXMETER CELL
6 — UP RIGHTS
7 — RAILING
8 — LUXMETER

FIG. 4 ENCLOSURE FOR LUMINOSITY TEST

B-3.2 The lamp shall be kept burning during the next three hours (after initial weighing) continuously inside the enclosure free from air draft, at its maximum non-smoking flame height. The distance between the flame of the lamp and photoelectric cell shall be adjusted to 100 cm. The flame and photo electric cell shall be in the horizontal plane and maximum incident light from the flame should fall on the cell.

B-3.3 The measurement of lux shall be made in four directions by rotating the lamp at every 90° angle. Average of the four readings shall be taken. Such readings shall be taken after every one hour (that is, after the first, second and third hour). The average of these three readings shall be noted.

At the end of the third hour, the final mass of the lamp shall be taken and the average fuel consumption in g/h shall also be noted.

B-4. CALCULATIONS

B-4.1 Luminous intensity and the lighting efficiency shall be calculated by the following formulae:

$$\text{Luminous intensity (cd)} = \text{Lux} \times (\text{Distance in metres})^2$$

$$\text{Lighting efficiency (cd g/h)} = \frac{\text{Luminous intensity (cd)}}{\text{Fuel consumption in g/h}}$$